

Ex-Ante Evaluation (for Japanese ODA Loan)

South American Division, Latin America and the Caribbean Department
Japan International Cooperation Agency

1. Name of the Project

Country: The Republic of Peru (hereinafter referred to as "Peru")

Project Name: Solid Waste Management Project (Phase 2)

Loan Agreement: June 27, 2022

2. Background and Necessity of the Project

(1) Current State and Issues in development of the Waste Sector in the country and the position of the Project

In Peru, as of 2019, approximately 21,658 tons of solid waste (household and commercial waste, excluding industrial waste. Hereinafter referred to as "waste") per day was generated in the country as a whole, while only 55.7% of the total volume was processed at the 57 sanitary landfills (hereinafter referred to as "sanitary landfill") in operation throughout the country.¹ In addition, the annual volume of waste has increased by 22.6% over the past decade, reaching approximately 7,781,904 tons per year in 2019. The 19 provinces out of the country's 25 provinces² have some kind of sanitary landfill, however, there are only 57 sanitary landfills compared to 1,585 open dumping sites³ in Peru, most cities do not have sanitary landfills, and the waste collected by municipalities is left in the open dumping sites and part of it is burned off there. As a result, pollution of groundwater and rivers by leachate from the waste, damage from bad odors and open fires, and spontaneous combustion due to methane gas generation have become serious problems for the sanitation environment in each city. In addition, in some open dumping sites, there are people whose livelihood depends on the collection of valuable materials discarded as waste (hereinafter referred to as "waste pickers"), and the health risk of infectious diseases through contacting waste is high. In order to improve the sanitary environment and to reduce health risk in these cities, there is an urgent need to properly dispose of waste in sanitary landfills and to close all of the open dumping sites in Peru. It is also important to provide social participation support for waste pickers who will lose their means of livelihood after the closure of open dumping sites.

¹ MINAM, "Reporte Anual de Gases de Efecto Invernadero del Sector Desechos 2016 (Waste Sector Greenhouse Gas Annual Report 2016)" published in 2021, (Hereafter referred to as "RAGEI 2016"), p. 11.

² RAGEI 2016, p. 11.

³ MINAM, "Política Nacional del Ambiente al 2030 (National Environmental Policy 2030)", published in 2021, p. 186.

In Peru, the General Law of Solid Waste (Ley General de Residuos Sólidos) was enacted in 2000, which stipulates comprehensive response to a series of processes from waste generation to final disposal. In accordance with the Law, the Ministry of Environment of Peru (hereinafter referred to as "MINAM") is in charge of the waste sector, while waste management and final disposal are the responsibility of each municipality. In 2011, MINAM formulated the "National Environmental Action Plan 2011-2021"⁴ to promote the proper treatment of waste and implements, and conducted the "Integrated Solid Waste Management Program"⁵ (hereinafter referred to as the "Overall Program"), which targeted 31 prioritized cities selected based on population size and other factors to develop an integrated waste collection and treatment system⁶. Under the Overall Program, JICA has been implementing the Solid Waste Management Project (hereinafter referred to as "Phase 1"), supporting the construction of sanitary landfills and procurement of equipment to strengthen waste collection and transportation capacity in 23 cities of the 31 prioritized cities in the Program, while the remaining cities are supported by the Inter-American Development Bank (hereinafter referred to as "IDB"). Under the overall program, this Project also targets 18 cities as a co-financing project with the IDB to close open dumping sites that will no longer be used as a result of the construction of sanitary landfills and to improve and strengthen waste management systems in each of the target cities.

(2) Japan and JICA's Cooperation Policy and Operations in the Waste Sector and the position of the Project

Japan's country assistance policy for Peru (September 2017) defines "environmental measures" as one of the priority areas and specifies support for the waste management sector. In addition, the JICA Country Analysis Paper for Peru (January 2014) places "environmental measures", including waste management, under the cooperation program "Environmental Improvement Promotion Program".

The Project collects landfill gas generated from waste at the closed open dumping site and burn methane gas in a combustion facility to be installed at the top of the gas vent pipe, thereby emitting carbon dioxide with a lower global warming potential, which contributes to SDG Goal 13 (urgent action to combat climate change and its impacts) by reducing greenhouse gas emissions. In addition, it will contribute to the realization of the G20 "Osaka Blue Ocean Vision" (July 2019) and the "JICA Clean City Initiative" (June 2021) on improving urban sanitation, as land-based waste management plays an important role in reducing marine plastic waste. Furthermore, this Project will contribute to SDG Goal 11 (make cities and human settlements inclusive, safe, resilient and sustainable) and Goal 12 (ensure sustainable consumption and production patterns), as it contributes to environmental improvement through improving integrated

⁴ Plan Nacional de Acción Ambiental PLANAA PERÚ 2011-2021

⁵ Includes projects maintained by local government.

⁶ Programa de Gestión Integral de Residuos Sólidos (GICA)

waste treatment and management capacity in local cities. It is highly significant for Japan and JICA to support the implementation of this Project.

(3) Other Donors' Activities

In Phase 1, the IDB is supporting the construction of sanitary landfills in the eight target cities and the procurement of equipment to strengthen waste collection and transportation capacity. Apart from the IDB, German Development Bank (KfW) is also aiming to form solid waste treatment projects in cities other than the current target cities, and is supporting municipalities to strengthen their waste management capacity.

3. Project Outline

(1) Project Objective

The purpose of the Project is to contribute to the improvement of the environment in the country by closing previously used open dumping sites and improving the integrated waste treatment and management capacity in cities in Peru where new sanitary landfills have been constructed in Phase 1.

(2) Project Site / Target Area

18 cities (Azángaro, Iruya, Ferreñafe, Huánuco, Moyobamba, Paita, Piura, Sechura, Jurriaca, Sullana, Tambopata, Tumbes, Nuevo Chimbote, Chachapoyas, Santiago, Huamanga, Abancay, Aymaraes)

(3) Project Components

- ① Closure of open dumping sites (installation of final soil cover, gas venting facilities, rainwater collection and drainage facilities, leachate drainage facilities, etc.)
- ② Support for the Project and services related to improving waste treatment and management capacity (detailed design, construction supervision, project assistance activities, support activities for municipalities, educational activities for residents, social participation support programs, communication programs)
- ③ Consulting services (project management support by international consultants)

(4) Estimated Project Cost

The total project cost is US\$60.05 million (Japanese ODA loan: US\$45.00 million).

(5) Schedule

August 2022 to October 2026 (50 months). Closing all the open dumping sites is considered as the completion of the Project (October 2026).

(6) Project Implementation Structure

- 1) Borrower: The Republic of Peru
- 2) Guarantor: None
- 3) Executing Agency: Ministry of the Environment (Ministerio del Ambiente)
- 4) Operation and Maintenance System: Operation and maintenance will be carried out by the municipalities in each target city under the support of MINAM's Solid Waste Management Bureau.

(7) Collaboration and Sharing of Roles with Other Donors

1) Japan's Activity

The 18 target cities for the Project were selected based on the Phase 1's target cities as well as based on coordination with the IDB, the co-financing partner. The closure of the open dumping sites supported by the Project will ensure that waste will be transported to the sanitary landfills that are under construction in Phase 1, and the effects of both projects will be realized.

2) Other Donors' Activity

The Project is a parallel co-financing with the IDB under the "Cooperation for Economic Recovery and Social Inclusion (CORE)". The IDB covers 11 cities out of the 31 target cities, excluding the 18 cities covered by the Project. IDB already signed L/A in October 2018.

(8) Environmental and Social Consideration/Cross-Sectoral Issues/Gender Category

1) Environmental and Social Considerations

① Category: B

② Reason for Categorization: The Project does not fall under the large-scale in waste treatment and disposal sector listed in the "Guidelines for Environmental and Social Considerations of the Japan International Cooperation Agency" (promulgated in April 2010), the undesirable effects on the environment are not considered significant, and the Project does not fall under the sensitive characteristics and sensitive areas listed in the Guidelines.

③ Environmental Permit: Under the country's national law, it is not mandatory to obtain an environmental permit for the closing project of open dumping sites, however, the preparation of "Pollution Dispersion Prevention Plan" is required at the time of detailed design. The plan will be prepared and approved by MINAM prior to the signing the contract for civil engineering works.

④ Anti-Pollution Measures: As for air quality, methane, ammonia, hydrogen sulfide, and other gases are currently generated from decomposing waste, and carbon monoxide and dust are generated from open burning and spontaneous combustion. The Project is expected to reduce the impact and to meet domestic standards. As for water and soil quality, water and soil pollution is currently caused by leaching from the waste layer, however, the Project is expected to reduce the water and soil pollution and to meet the domestic standards. During construction, it is anticipated that exhaust gas and dust are generated from the operation of heavy equipment and vehicles, however, the impact will be mitigated through equipment maintenance and water sprinkling. Noise and vibration caused by heavy equipment and vehicles are expected to be minimized because there are no residences, hospitals, or schools near the Project sites, and no nighttime construction will be conducted. Water pollution

will occur as a result of the construction work, but the pollutants will be discharged after settling in a sedimentation basin.

- ⑤ Natural Environment: The Project area is not located in or near a sensitive area such as a national park, etc., and is expected to have minimal undesirable effects on the natural environment.
- ⑥ Social Environment: In the Project, there will be no involuntary resettlement, but in cities where individuals or communities have ownership or right of use for open dumping sites, those sites will be acquired in accordance with the Abbreviated Resettlement Plan (ARAP) prepared in accordance with the national procedures and JICA Guideline. In the sites where the community owns the land, the land utilization rights are transferred from the community to the municipality only during the implementation of the Project. In one city, the site has already been acquired. In addition, since approximately 300 waste pickers have been identified near the project sites, the Project plans to implement social participation support programs, such as job training and job transition, in cooperation with each municipality. Although no particular objections to the Project were raised in the stakeholder consultations held in 2015, including those of the waste pickers, it is planned that all target cities will be re-confirmed through stakeholder consultations before construction begins to ensure that there are no changes in the situation, and the procedures, compensation, support programs, etc. that reflect the requests of the affected residents will be carried out.
- ⑦ Other/Monitoring: Air quality, water quality, waste, soil contamination, noise and vibration will be monitored during construction by the executing agency with the support of services related to construction management, and after the start of service, each municipality will conduct monitoring with the support of the executing agency. The status of social participation of waste pickers will be monitored by the executing agency in cooperation with municipality during construction and by each municipality after the start of service with the support of the executing agency.

2) Cross-Sectoral Issues: Projects Related to Climate Change

The Project contributes to the reduction of greenhouse gas (GHG) emissions by burning methane gas generated from waste and emitting carbon dioxide with a lower global warming potential, thus contributes to climate change measures (mitigation measures). (For the calculation of the internal rate of return as a quantitative effect of the Project, greenhouse gas reductions will be calculated based on assumptions. It is assumed that GHG emissions will be reduced by an average of approximately 240,000 tons per year until 2052, 30 years after the start of the project.)

3) Gender Category: [Not applicable] (GI) Gender Mainstreaming Needs Assessment and Analysis Project

<Reason for the classification> Although gender mainstreaming needs were investigated during the screening, no specific initiatives that contribute to gender equality or women's empowerment are planned.

(9) Other Important Issues: None in particular

4. Targeted Outcomes

(1) Quantitative Effects

1) Outcomes (Operation and Effect Indicators)

Indicator	Standard (Actual values in 2021)	Target (2028) [Two years after completion]
Exposed waste area (ha)	249.12	0
Amount of dumping into open dumping sites (m ³)	11,343,643	0
Hydrogen sulfide concentration (µg/m ³)	Using actual values at the time of detailed design	150
Proper Management of Leachate at Open Dumping Sites ⁷ (number of sites)	1	18
Open burning in open dumping sites (number of sites)	11	0

⁷ The state that the final cover is in place and there is no infiltration of rainwater, and leachate is not seeping out of the closed area through slopes or other means.

Percentage of waste pickers participating in waste-related work employment assistance programs (%)	Using actual values at the time of the detailed survey of the Social Participation Support Program	Target values will be set according to standard values
Percentage of waste pickers participating in vocational training programs (%)	Using actual values at the time of the detailed survey of the Social Participation Support Program	Target values will be set according to standard values

(2) Qualitative Effects

Reduction of groundwater and air pollution and improvement of integrated waste treatment and management capabilities.

(3) Internal Rate of Return

Based on the following assumptions, the economic internal rate of return (EIRR) for the Project shall be 19.9%. As in Phase 1, the financial internal rate of return (FIRR) will not be calculated since the Project does not plan the recovery of investment costs through toll collection.

[EIRR]

Cost: Project costs, operation and maintenance costs (excluding taxes)

Benefit: Effects on preservation of the living environment and improvement of public health, and effects on reduction of greenhouse gas emission

Project Life: 30 years

5. External Factors and Risk Control

(1) Preconditions

As the Project plans to close the open dumping sites, it is necessary for the target municipalities to initiate social participation support measures under the guidance of MINAM for the waste pickers (about 300 people) in the target cities prior to the closure work. The target municipalities are required to sign an agreement with MINAM for the implementation of the Project in the open dumping sites before the start of the Project, including the social participation support measures. MINAM confirmed that each city needs to sign the agreement before the start of the loan implementation.

(2) External Factors

None in particular.

6. Lessons Learned from Past Projects

In the 2002 ex-post evaluation of the “Jakarta Municipal Solid Waste Management Project”, it was pointed out that the lack of specific waste picker countermeasures by local governments was hindering safe waste disposal. Therefore, it is desirable to take concrete measures to prevent waste pickers from taking root, including educational activities for residents in the surrounding areas concerning waste disposal. The Project will implement existing waste picker countermeasures following Phase 1 in order to prevent the establishment of waste pickers at the sanitary landfill from the viewpoint of project effectiveness. In addition, since the waste pickers will not be able to earn income from the collection of valuable materials at the open dumping site once the sanitary landfill is constructed in Phase 1, the Project will support their participation in society through the project support personnel to be hired under the Project and encourage their employment in waste-related businesses or employment in other industries.

7. Evaluation Results

The Project will contribute to SDG Goal 13 (take urgent action to combat climate change and its impacts) by contributing to the reduction of greenhouse gas (GHG) emissions through the combustion of methane gas generated from waste, thereby reducing carbon dioxide emissions with a lower global warming potential. The Project will also contribute to environmental improvement through the improvement of integrated waste treatment and management capacity in local cities, and will contribute to SDG Goal 11 (make cities and human settlements inclusive, safe, resilient and sustainable) and Goal 12 (ensure sustainable consumption and production patterns), and therefore there is a strong need to support the implementation of the Project.

8. Plan for Future Evaluation

(1) Indicators to be used

As indicated in Sections 4.

(2) Future evaluation schedule

Ex-post evaluation: 2 years after the project completion

END